

## MACHINE SAFETY

Farmers need to use many kinds of machines. While they are very useful, they can also be dangerous. This chapter provides simple solutions to reduce your risks of machine accidents. Guards, safe feeding devices, and good maintenance are the keys to the safe use of machines. Electrical accidents are another serious safety problem among farmers. In this chapter, you will find practical measures to ensure the safe use of electricity.

### **CHECKPOINT 16**

***Purchase safe machines and maintain them properly.***

#### **BENEFITS FOR FARMERS**

- Agro-machines are big investments that help you increase productivity. However, they may also cause troubles and accidents to you when some parts of the machines are not protected safely. Before purchasing a machine, study its safety aspects carefully to identify all possible dangers. Are all dangerous parts well guarded ?

- Regular maintenance keeps your machinery productive and safe. Check all machine parts carefully. In particular, special care is needed for rotating parts, guards, and electrical wires etc.

#### **HOW TO IMPROVE**

1.) Before purchasing a machine, study and observe it carefully. Make sure that all moving parts are well guarded and electrical wires are well protected. Check whether all feeding and ejection parts can work safely. Switch it on and test the machine to see if it runs well. Can your hands be free from danger while the machine is in motion?

2.) Fix maintenance days at regular intervals. Develop a maintenance diary and record conditions.

3.) Protective guards as well as mechanisms need to be checked carefully.

4.) Maintenance should be carried out by qualified/experienced family

persons. Call for assistance from such experienced persons in your village. Or you should be trained. Machinery sellers or local agricultural officers will help you. Without sufficient experience, machines could be a danger to you and your family.

5.) While maintaining or repairing a machine, the machine must be switched off and electrical connection cut. Hang a tag, "DANGER, DO NOT OPERATE".

#### **WAY TO PROMOTE COOPERATION**

Your village must have persons experienced in selecting safe machines and maintaining machines in good conditions. Learn from them, and even ask them to conduct on-site short training for other farmers. Recognize that farmers who maintain machines play a very important role for villagers. Neighbourhood cooperation is necessary to promote safe use and maintenance of machines.

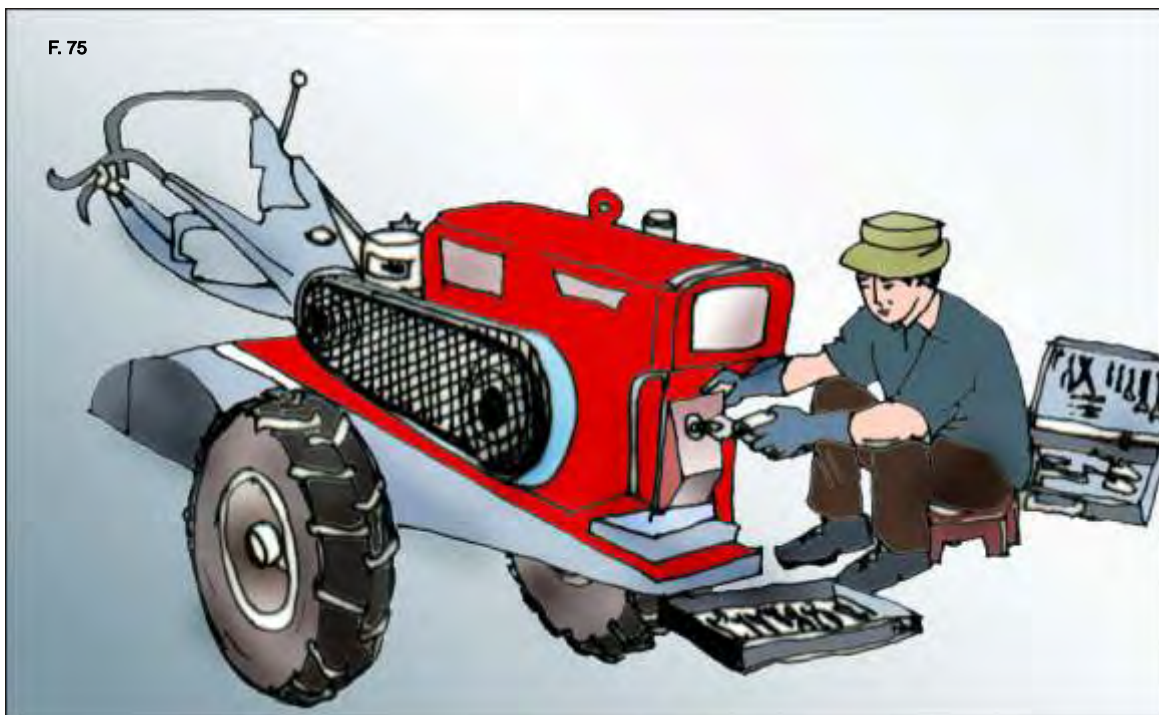
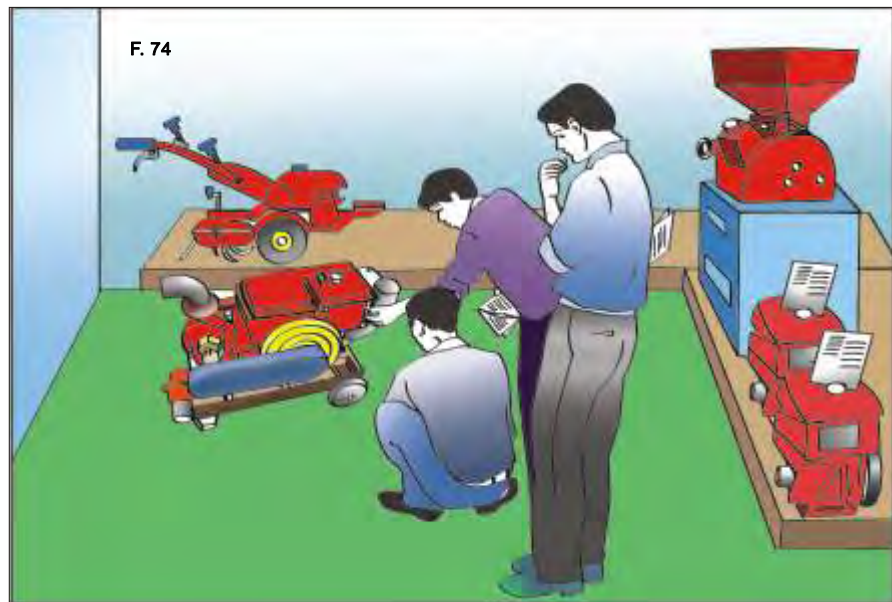
#### **SOME MORE HINTS**

You may find an inexpensive machine. You need to check its safety aspects even more carefully. Once accidents occur, costs can be enormous.

#### **POINTS TO REMEMBER**

*Only safe machines can contribute to higher productivity. Machines are not inexpensive: study safety aspects carefully before purchasing them.*

*Figure 74:*  
*Purchase pumps or engines in which all moving parts are carefully protected.*



*Figure 75:* Assign a qualified person to be responsible for maintenance in order to avoid break downs due to lack of experience.

### **CHECKPOINT 17**

***Attach proper guards to dangerous moving parts of machines.***

#### **BENEFITS FOR FARMERS**

- Attaching proper guards to moving parts of machines is easy and rewarding. Moving parts of the machine pose accident risks to farmers. Serious injuries could occur from gears, rollers or belts. Without guards, dangerous items such as sharp objects and hot metal may even fly out from moving points. Simple, hand-made guards can greatly reduce such risks.

- Unguarded machines could harm not only users but visitors and family members (often children) who may pass by the machine. Risks could be even higher for them since they do not understand how the machine operates and what precautions are necessary. Machine guards can protect your friends and family members, too.

#### **HOW TO IMPROVE**

1.) Make guards and covers for the moving parts of machines. Use available materials such as wood or steel pieces. Select strong, durable materials.

2.) Guards and covers need to be detached easily for repairs and maintenance. Design them in such a way.

3.) Where you need to observe the operation of machines inside the guards, use transparent materials such as plastics or metal nets to make the guards.

4.) For machines located in areas where many people are passing by, install fences made of wood or bamboo to limit access to them.

#### **WAY TO PROMOTE COOPERATION**

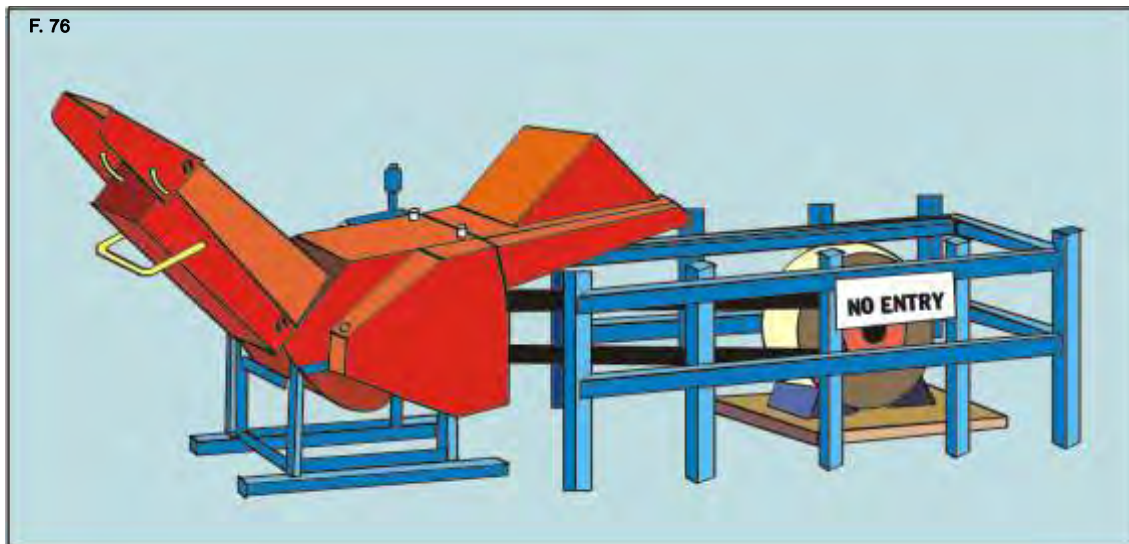
Look around at various jobs done in your village together with your neighbours. Identify where and when they use what machines. Define risky parts of machines and list the machines which need appropriate guards. Discuss suitable solutions and design and attach appropriate guards using locally available materials.

#### **SOME MORE HINTS**

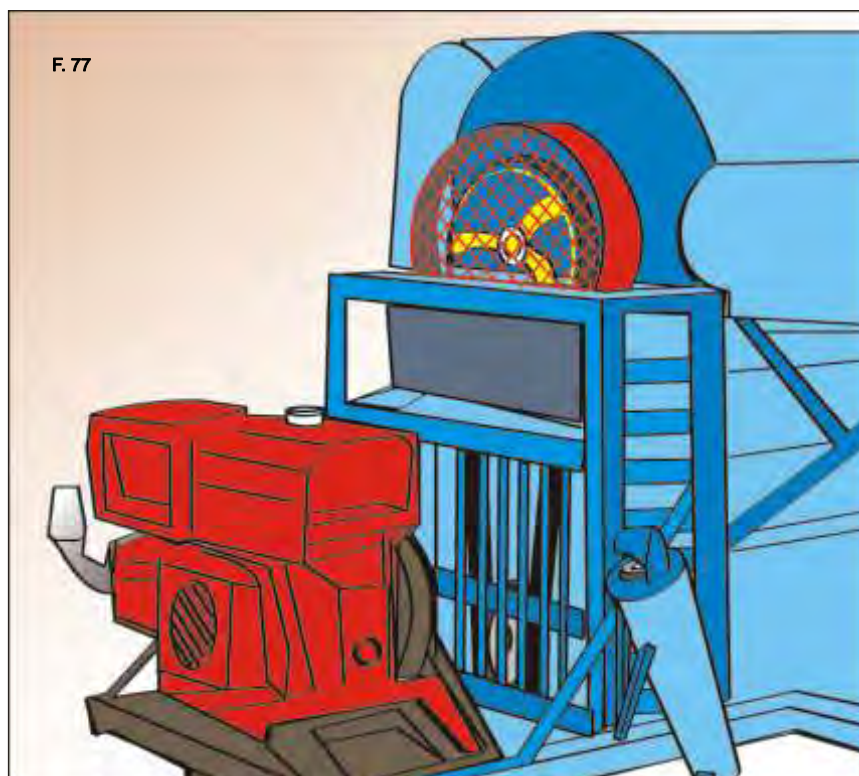
Guards must be tightly fixed to machines. Before operating the machine, carefully check each bolt and nut of the attached guards. If necessary, tighten them again. When not fixed well, temporary or removable guards could cause serious accidents to farmers.

#### **POINTS TO REMEMBER**

*Working near the moving parts of machines is very dangerous. The best protection is preventing contact by attaching guards instead of instructing farmers to avoid it.*



*Figure 76:* Install fences to limit the access to machine located in areas where many people are passing by.



*Figure 77:* Safety guard made by local available materials. If necessary use transparent materials such, as metal nets, to make guards so that tasks can be clearly observed.

**CHECKPOINT 18**

***Use appropriate feeding devices to avoid danger and increase production.***

**BENEFITS FOR FARMERS**

- Feeding devices can help you prevent serious accidents. Do remember that your hands are at great risk when feeding materials into machines. For example, very unfortunately, several farmers in Cantho Province in Vietnam lost their hands and arms while feeding rice bundles into threshing machines. The same dangers exist when working with milling, grinding, or husking machines. Only by a minor mistake, your hand, an important part of the human body, could be injured immediately. Feeding devices could reduce such risks significantly.
- Appropriate feeding devices can also speed up your work as well as provide safety. Repetitive motion of your arms and hands while feeding will cause fatigue and make your work slow. Simple gravity or automatic feeding mechanisms make the work much easier and save your working time. Productivity will obviously increase.

**HOW TO IMPROVE**

- 1.) Design gravity feeding devices in the form of a chute. The feeding devices should be fixed firmly to the machine. From the opening part, raw materials will slide into the machine. This idea can be applied to threshing machines.
- 2.) Design funnel devices and place

them close to the feeding mouth of the machine. The weight of the farm products will push them into the machine. This mechanism can be applied for pressing, milling or grinding of farm products.

**WAY TO PROMOTE COOPERATION**

Walk around your village and farms. You will find some feeding devices used by your neighbours. How have they been invented and used? Share technical experiences with them. Show your machines to them and design and improve your feeding and ejection devices together.

**SOME MORE HINTS**

- While fitting or attaching feeding devices to your machine, ensure that they do not interfere with existing guards and other safety devices of the machine.
- Regularly inspect and maintain feeding devices.

**POINTS TO REMEMBER**

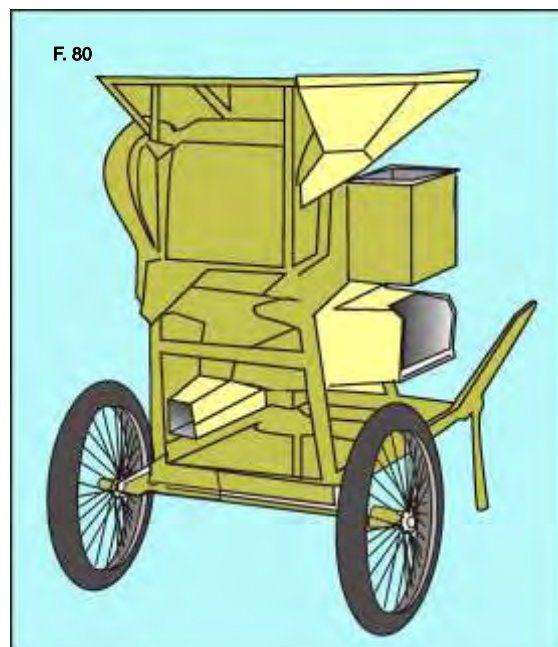
*Use convenient feeding devices to avoid accidents and improve your productivity.*



*Figure 78* : Feeding device in form of a conveyor which gradually carries the bundles of rice into the threshing machine.



*Figure 79*: A milling machine with a funnel-shaped feeding device.



*Figure 80* : A corn-plucking machine with a trough-shaped feeding device.

### **CHECKPOINT 19**

***Make the emergency controls clearly visible and attach local language labels to the controls or switches.***

#### **BENEFITS FOR FARMERS**

- Emergency stop switches of any machine must be clearly visible. Accidents and mistakes could happen unexpectedly. Immediate action is needed when someone is caught in dangerous machine parts. Emergency controls need to be well designed so that everybody, including visitors and outsiders, can easily see them and understand how they work.

- Place a label on each of the switches and controls to avoid misunderstanding and mistakes. The labels should be clearly visible and use simple, easy-to-understand words. Of course they must be written in the local language.

- It is wise to use different colours and shapes for different controls and switches. Similar colours and shapes may cause misunderstanding even to farmers using the machine every day. The result could be serious accidents.

#### **HOW TO IMPROVE**

1.) Place emergency controls or switches of machines within easy reach of users. Separate them from other switches.

2.) When emergency controls or switches are placed in the same area with other control buttons, make the emergency control outstanding and easy-to-see. For example, use a red

colour, bigger size and a peculiar shape.

3.) Use big and clear characters for labels of controls and switches. Replace unclear labels or labels written in a foreign language with labels clearly written in the local language.

#### **WAY TO PROMOTE COOPERATION**

You can find emergency switches at home and on agricultural machines in the farm. Are they clearly visible and easy-to-understand? Encourage your family and farmer friends to attach clear labels to controls and switches. They must be written in the local language. Design together clearly visible switches and controls. Share good designs with your neighbours.

#### **SOME MORE HINTS**

- Label clearly what operation is meant. If you use symbols for switches, they must be clear and easy-to-understand.

- Direction of controls and switches must be easy-to-understand using common sense and local customs. For example, ON should be upward, and OFF downward, etc.

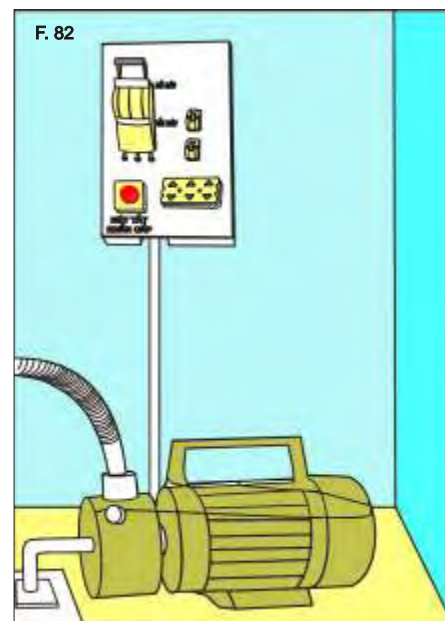
#### **POINTS TO REMEMBER**

*Clearly visible and easy-to-understand controls or switches will save you, your family and your friends in case of emergency.*



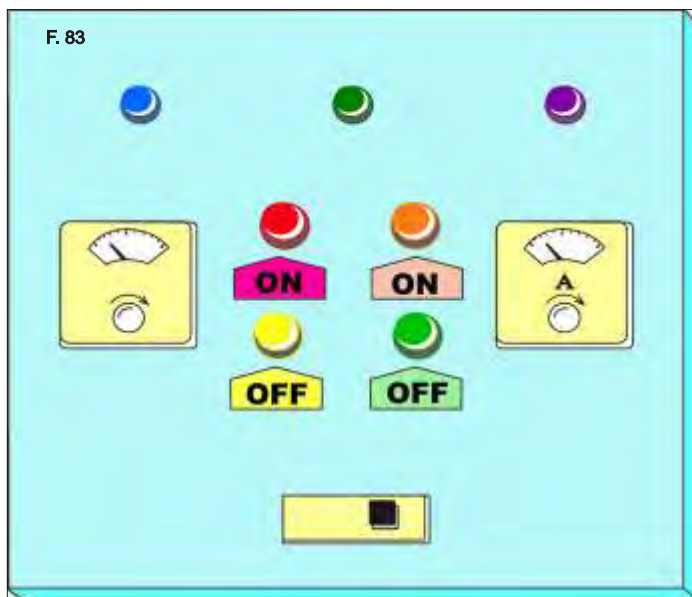
F. 81

*Figure 81: Place emergency control of the machine clearly visible and within easy reach of users..*

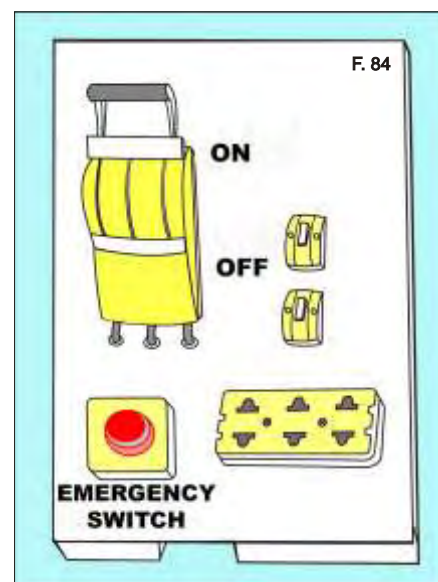


F. 82

*Figure 82: Clearly visible emergency controls of a pump attached to an electricity board.*



F. 83



F. 84

*Figure 83, 84: An electricity board with controls, switches and displays, which are written in the local language.*

**CHECKPOINT 20**

***Ensure safe use of electricity for machines and equipment.***

**BENEFITS FOR FARMERS**

- Farmers use electricity for many purposes. Unfortunately, electrical accidents are increasing among farmers. Some farmers use electricity to catch fish and are electrocuted. Safe use of electricity is required for the happiness of families and communities.

- Farmers need to use many kinds of machines such as tractors, threshing machines, or water pumps in field conditions, exposing them to humid and wet environments. The junctions connecting electrical wires and machines are another main cause of electrocution or machine break-down. Unprotected electrical connections can cause serious accidents, and could harm not only machine operators but also other farmers, families, or visitors passing by the farm. Careful covering of all electrical wires connected to machines and their proper maintenance can prevent electrical accidents and machinery damage.

**HOW TO IMPROVE**

1.) Check all electrical junctions. Fix them carefully with an electrical adhesive tape. Do not leave any junctions uncovered and be sure that nobody will touch them.

2.) Any damaged or scratched electrical junctions must be replaced with new, safe ones immediately.

3.) Protect all circuits and wires with circuit breakers or fuses. The main power switches and breaker boxes should be clearly marked.

**WAY TO PROMOTE COOPERATION**

Electrical safety needs special skills and experience. There must be some persons in your village who are strong in electrical safety. It is a good idea to have a brief on-site training on electrical safety. Share experiences among villagers, and develop joint maintenance plans for all electrical safety in your village.

**SOME MORE HINTS**

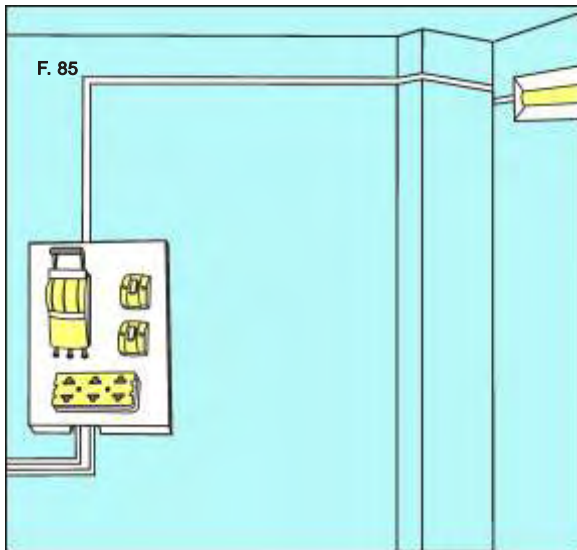
- Use approved electrical plugs and circuits. Cheap versions may cause short circuits, resulting in accidents and machine break-down.

- Don't use electricity to catch fish and other animals.

- All electrical equipment should be earthed correctly. An independent earthing rod should be used to connect earthing wires from machines.

**POINTS TO REMEMBER**

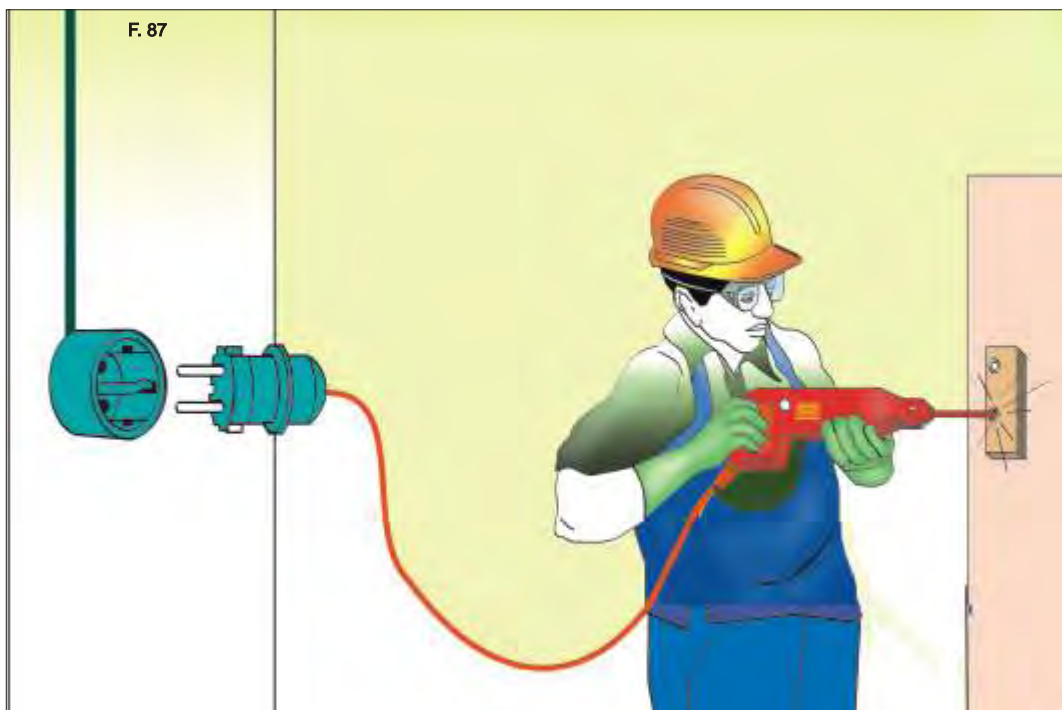
*Well protected electrical wires that are maintained properly can prevent accidents and machine damage.*



*Figure 85: Switch board and wires are carefully sheathed.*



*Figure 86: Electrical wires connected to the machine are well protected and clearly labeled.*



*Figure 87: Use appropriate electrical plugs with earthed correctly.*

